NAME KEY

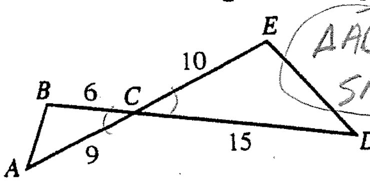
## 7–5 Theorems for Similar Triangles

### Written Exercises

**Name two similar triangles. What postulate or theorem justifies your answer?**

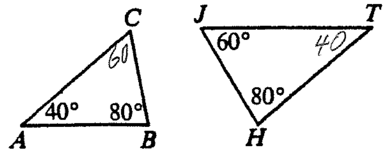
$\frac{2}{3}$ $\frac{6}{9} = \frac{10}{15} \to \frac{2}{3}$

**1.**




$\triangle ABC \sim \triangle DEC$
SAS Similarity

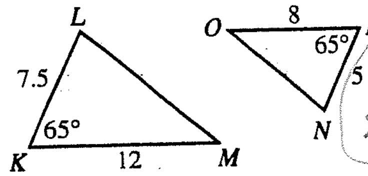
**2.**




$\triangle ABC \sim \triangle THJ$
AA similarity

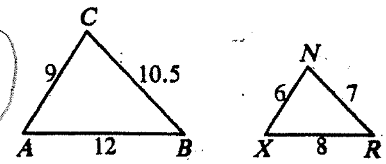
$\frac{7.5}{12} = \frac{5}{8}$

**3.**




$\triangle LKM \sim \triangle NPO$
SAS Similarity

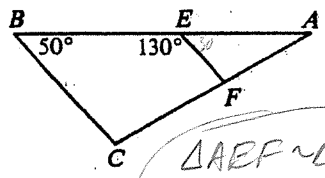
**4.**




$\frac{9}{6} = \frac{10.5}{7} = \frac{12}{8}$

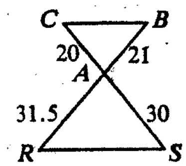
$\triangle ABC \sim \triangle XRN$
SSS Similarity

**5.**




$\triangle AEF \sim \triangle ABC$
AA Similarity

**6.**




$\triangle ABC \sim \triangle ARS$
SAS Similarity

$\frac{20}{21} = \frac{30}{31.5}$

**One triangle has vertices *A*, *B*, and *C*. Another has vertices *T*, *R*, and *I*. Are the two triangles similar? If so, state the similarity and the scale factor.**

work for checking ratios
reason
scale factor

| | *AB* | *BC* | *AC* | *TR* | *RI* | *TI* |
|---|---|---|---|---|---|---|
| **7.** | 6 | 8 | 10 | 9 | 12 | 15 |
| **8.** | 6 | 8 | 10 | 12 | 22 | 16 |
| **9.** | 6 | 8 | 10 | 20 | 25 | 15 |
| **10.** | 6 | 8 | 10 | 10 | 7.5 | 12.5 |

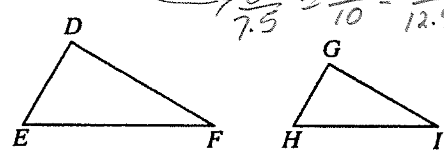
7. $\to \frac{6}{9} = \frac{8}{12} = \frac{10}{15} = \frac{2}{3}$ yes, SSS Similarity $\underline{2:3}$

8. NO $\frac{6}{12} = \frac{8}{16} \neq \frac{10}{12}$

9. $\to \frac{6}{15} = \frac{8}{20} = \frac{10}{25} = \frac{2}{5}$ yes, SSS Similarity $\underline{2:5}$

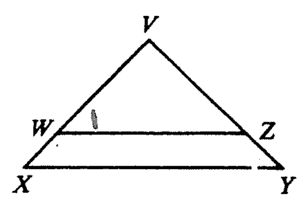
10. $\to \frac{6}{7.5} = \frac{8}{10} = \frac{10}{12.5} = \frac{4}{5}$ yes, SSS Similarity $\underline{4:5}$

**11.** Given: $\frac{DE}{GH} = \frac{DF}{GI} = \frac{EF}{HI}$
Prove: $\angle E \cong \angle H$



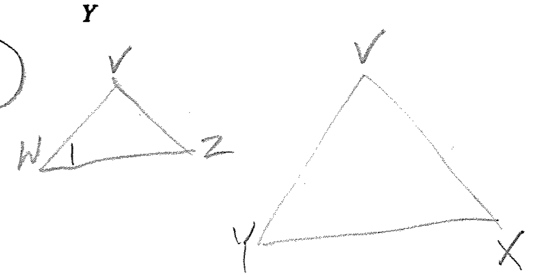

**12.** Given: $\frac{DE}{GH} = \frac{EF}{HI}$; $\angle E \cong \angle H$
Prove: $\frac{EF}{HI} = \frac{DF}{GI}$

**13.** Given: $\frac{VW}{VX} = \frac{VZ}{VY}$
Prove: $\overline{WZ} \parallel \overline{XY}$




**14.** Given: $\frac{VW}{VY} = \frac{VZ}{VX}$
Which one(s) of the following *must* be true?
(1) $\triangle VWZ \sim \triangle VXY$ NO (2) $\overline{WZ} \parallel \overline{XY}$ (3) $\angle 1 \cong \angle Y$

re-draw diagram
w/ vertices
corresponding



# 7.5 HW Answer Key

(11) ① $\frac{DE}{GH} = \frac{DF}{GI} = \frac{EF}{HI}$ $\rightarrow$ ② $\triangle DEF \sim \triangle GHI$ $\rightarrow$ ③ $\angle E \cong \angle H$

① Given
② SSS ~ SSS
③ ~△s → angles ≅.

(12) ① $\left.\begin{array}{l} \frac{DE}{GH} = \frac{EF}{HI} \\ \angle E \cong \angle H \end{array}\right\}$ $\rightarrow$ ② $\triangle DEF \sim \triangle GHI$ $\rightarrow$ ③ $\frac{EF}{HI} = \frac{DF}{GI}$

① Given
② SAS ~ SAS
③ ~△s → corresp. sides proportional

(13) $\left.\begin{array}{l} ①\ \frac{VW}{VX} = \frac{VZ}{VY} \\ ②\ \angle V \cong \angle V \end{array}\right\}$ $\rightarrow$ ③ $\triangle VWZ \sim \triangle VXY$ $\rightarrow$ ④ $\angle VWZ \cong \angle X$ $\rightarrow$ ⑤ $\overline{WZ} \parallel \overline{XY}$

① Given
② Reflexive Prop.
③ def. of ~△s
④ ~△s → ∠s ≅
⑤ 2 lines & corresp. ∠s ≅ → 2 ∥ lines.

(15) $\left.\begin{array}{l} ①\ \frac{JL}{NL} = \frac{KL}{ML} \\ ②\ \angle JLK \cong \angle MLN \end{array}\right\}$ $\rightarrow$ ③ $\triangle JLK \sim \triangle NLM$ $\rightarrow$ ④ $\angle J \cong \angle N$

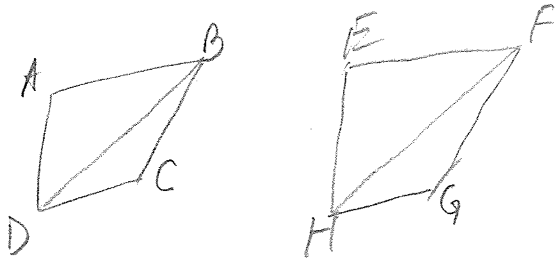
① Given
② Vertical ∠s ≅.
③ def. of ~△s
④ ~△s → ∠s ≅.

(16) ① $\frac{AB}{SR} = \frac{BC}{RA} = \frac{CA}{AS}$ → ② $\triangle ABC \sim \triangle SRA$ → ③ $\angle C \cong \angle SAR$ → ④ $\overline{BC} \parallel \overline{AR}$

① Given
② SSS ~ SSS
③ ~$\triangle$s → $\angle$s ≅
④ 2 lines w/ corresp. $\angle$s ≅ → 2 ∥ lines.

(17) See 7.5 class notes. You should be able to do this proof without looking at your notes.

(18)



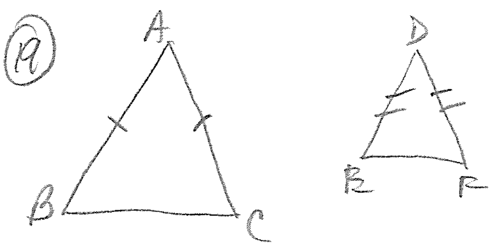

Given: $ABCD \sim EFGH$

Prove: $\frac{BD}{FH} = \frac{AB}{EF}$

① $ABCD \sim EFGH$ → ② $\angle A \cong \angle E$, $\frac{AB}{EF} = \frac{AD}{EH}$ → ③ $\triangle ABD \sim \triangle EFH$ → ④ $\frac{BD}{FH} = \frac{AB}{EF}$

① Given
② def. of similar polygons
③ def of ~$\triangle$s
④ ~$\triangle$s → corresp. sides proportional

(19)




Given: $\triangle ABC$ isos.
$\triangle DEF$ isos.
$\angle A \cong \angle D$

Prove: $\triangle ABC \sim \triangle DEF$

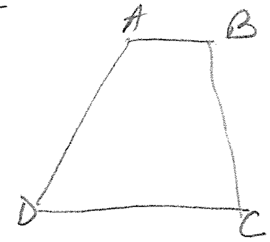
① $\triangle ABC$ & $\triangle DEF$ isosceles → ② $\overline{AB} \cong \overline{AC}$, $\overline{DE} \cong \overline{DF}$ → ③ $AB = AC$, $DE = DF$ → ④ $\frac{AB}{DE} = \frac{AC}{DF}$, ⑤ $\angle A \cong \angle D$ → ⑥ $\triangle ABC \sim \triangle DEF$

(20) Plan: (1) Show $\triangle AVB \sim \triangle DWC$

(2) Set up a proportion

(3) Since median $= \dfrac{AB+DC}{2}$,

find what DC equals in terms of AB.




Given: $VA = VB$

$VW = 4VA$

(In the cube, $VW = WC = DW$. Therefore, $WC = 4VA$, $DW = 4VA$)

(1) $VW = 4VA$

(2) $VW = WD = WC$

$\rightarrow$ (3) $WD = 4VA$, $WC = 4VA$

(4) $VA = VB$

$\rightarrow$ (5) $WC = 4VB \rightarrow \dfrac{WC}{VB} = 4$

(6) $\dfrac{WD}{VA} = 4$

(7) $\dfrac{WD}{VA} = \dfrac{WC}{VB}$

(8) $\angle AVB$ is Rt, $\angle DWC$ is Rt $\rightarrow$ (9) $\angle AVB \cong \angle DWC$

$\rightarrow$ (10) $\triangle WDC \sim \triangle VAB$

(11) $\dfrac{WD}{VA} = \dfrac{DC}{AB}$

(12) $\dfrac{WD}{VA} = 4$

$\rightarrow$ (13) $\dfrac{DC}{AB} = 4 \rightarrow$ (14) $DC = 4AB$ (end of proof)

(1) Given
(2) Cube $\rightarrow$ all sides $=$
(3) Substitution
(4) Given
(5) Substitution
(6) Division prop.
(7) Substitution
(8) Cube $\rightarrow \angle$s Rt.
(9) All Rt $\angle$s $\cong$.
(10) def. of $\sim \triangle$s
(11) $\sim\triangle$s $\rightarrow$ corresp. sides proportional
(12) see step #6
(13) Substitution
(14) Multiplication prop.

$$\text{median} = \frac{AB+DC}{2} = \frac{AB+4AB}{2} = \boxed{\frac{5AB}{2}}$$

(21) (1) $OR' = 2OR$ $\rightarrow$ (2) $\frac{1}{2}OR' = OR$ $\rightarrow$ (3) $R$ is midpt of $OR'$

$OS' = 2OS$ $\rightarrow$ $\frac{1}{2}OS' = OS$ $\rightarrow$ $S$ midpt $OS'$

$OT' = 2OT$ $\rightarrow$ $\frac{1}{2}OT' = OT$ $\rightarrow$ $T$ midpt $OT'$

$\rightarrow$ (4) $\overline{RT}$, $\overline{TS}$, $\overline{RS}$ are midsegments $\rightarrow$ (5) $RT = \frac{1}{2}R'T'$ $\rightarrow$ (6) $\frac{RT}{R'T'} = \frac{1}{2}$

$RS = \frac{1}{2}R'S'$ $\rightarrow$ $\frac{RS}{R'S'} = \frac{1}{2}$

$ST = \frac{1}{2}S'T'$ $\rightarrow$ $\frac{ST}{S'T'} = \frac{1}{2}$

$\rightarrow$ (7) $\frac{RT}{R'T'} = \frac{RS}{R'S'} = \frac{ST}{S'T'}$ $\rightarrow$ (8) $\triangle RST \sim \triangle R'S'T'$

(1) Given

(2) Division prop

(3) Def. of midpt

(4) Def of midsegment

(5) If a seg. joins 2 midpts of 2 sides of $\triangle$, then that seg is $\frac{1}{2}$ meas. of $3^{rd}$ side.

(6) Division prop.

(7) Substitution

(8) $SSS \sim SSS$